Project to show direct current can power data centers

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MANHASSET — Researchers at the Dept. of Energy's Lawrence Berkeley National Laboratory have teamed with 20 hi-tech companies including Sun Microsystems, Intel, and Cisco to demonstrate using direct current technologies to power data centers and hopefully save billions of dollars a year in the energy costs of operating them.

The demonstration is taking place this summer through August at Sun's test facility in Newark, Calif.

Data centers are the backbone of the Internet. "They can use 100 times the electricity of a typical office building on a square foot basis," said William Tschudi, the Berkeley Lab principal investigator for this project. "Energy costs of $1 million per month are not uncommon in large data centers that require megawatts of electricity."

In typical data centers, the loss in electrical power is through constant power conversions flowing to the IT equipment. Using direct current instead of alternating current from the electricity grid eliminaties power conversion losses and reduces the energy needed to run the centers by 10 to 20 percent, as measured at the demonstration center.

The demonstration shows how a dc-powered data center could skip the conversion from 480 to 208 volts and provide dc power directly to the servers.

Project leaders hope that the demonstration to switch to new technologies without field experience will show that the switch could be done safely and would have operational and economic benefits, without causing unanticipated problems.

Pentadyne Power Corp. supplied the flywheel-based clean energy storage system connected to a rectifier that converts the incoming utility grid ac into 400-volt dc power.

Researchers in Berkeley Lab's Environmental Energy Technologies Division (EETD) proposed the technology demonstration and the California Energy Commission's Public Interest Energy Research (PIER) program sponsored the work.

The Berkeley Lab team of project leader William Tschudi, Steve Greenberg, and Evan Mills conceived the project, being executed by private-sector firms ECOS Consulting and EPRI Solutions.

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